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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/700,832	11/04/2003	Badhri Narayan	87256NAB	5774

7590 01/06/2006

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EXAMINER
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PHAM, HAI CHI

ART UNIT	PAPER NUMBER
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2861

DATE MAILED: 01/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/700,832

Applicant(s)

NARAYAN ET AL.

Examiner

Hai C. Pham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6, 9-25 and 28-50 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 9-25 and 28-50 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 November 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Drawings*

1. The drawings were received on 11/01/05. These drawings are accepted.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

3. Claims 37-39 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- The method steps as claimed in claims 37-39 for “forming an image onto a photosensitive medium” are not appropriate. The limitations as claimed are mostly tailored to a method of manufacturing the print head assembly, i.e., “fitting an illumination array of LED light sources into a housing”, “seating a lens array against said housing” (claim 37), or “providing at least one optical fiber” (claim 38), “forming a series of grooves in said housing” and “providing a reflective surface within at least one surface of at least one of said grooves” (claim 39). The only instance where a step of forming an image is found is in the limitation “exposing pixels of the photosensitive medium in a succession of exposures”, which is merely a repetition of the preamble without providing any further details. In other words, the combined limitations, namely “fabricating a multichannel

printhead" and "exposing pixels" are misleading with respect the ultimate goal set forth in the preamble for a "method for forming an image" since it is not required to fabricate a [new] printhead assembly *each time* the printing operation is requested. Moreover, as indicated at method step (2) "using said multichannel printhead, exposing pixels of the photosensitive medium in a succession of exposures" (emphasis added), the claimed method steps in claims 37-39 would be more fitted for manufacturing a print head to be used later by an eventual end user to form an image onto the photosensitive medium.

Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-2, 5, 7, 10-13, 35-38, 40, 44-47, 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimoda (U.S. 6,208,829) in view of Sato (U.S. 5,260,587) and Shreeve (GB 2090669).

Shimoda discloses in Figs. 6-7 an image forming apparatus comprising a multichannel print head for forming an image onto a photosensitive medium (16) by exposing pixels in a succession of exposures, the print head (exposure head 14) comprising an illumination array of light emitting diode light sources (array of LED array

elements 120), a lens array (26) comprising a plurality of lenses (24), a light-guiding array of uniformizer elements (fiber array 20 as array of light transmission members), arranged between the light source array and the lens array, and wherein, for each pixel exposed on the photosensitive medium (16) a single said LED light source in said illumination array provides light into a single corresponding said uniformizer element in said light-guiding array which directs light to a corresponding said lens of said lens array (see Fig. 7).

Shimoda fails to teach the integral housing made of silicon into which are fitted the light emitting diode light sources, the fiber array and the lens array.

Sato discloses an optical semiconductor device comprising an array of LED elements (12), the lens array (14) and an array of optical fibers (11) aligned in a single correspondence on the same substrate (20) made of silicon.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the integral housing to hold the various optical elements together in the device of Shimoda as taught by Sato. The motivation for doing so would have been to fixedly and precisely align the various optical elements.

Shimoda also fails to teach the lens array being a plurality of compound lenses, each said compound lens comprising a plurality of aspheric surfaces.

Shreeve discloses a projection lens array used in an optical scanner comprising a plurality of compound lenses (three array sets 10-12 of projection lenses 13) (Fig. 1), the lenses being aspherical converging lenses (see Abstract).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate compound lenses having aspherical surfaces in the device of Shimoda as taught by Shreeve. The motivation for doing so would have been minimize the lens aberration to avoid light coupling loss.

Shimoda further teaches the uniformizer being an array of optical fibers, the LED light sources emitting the same wavelength.

On the other hand, although the lenses are known to have sag and specific refractive index, Shimoda does not explicitly teach that the sag of any of the plurality of aspheric surfaces is less than about 40 microns and the refractive index greater than 2.0. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide Shimoda with the lenses having the proper value of sag and refractive index as claimed, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

6. Claims 3-4, 6, 15, 39, 41, 43, 48, 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimoda in view of Sato and Shreeve, as applied to claims 1, 37, 40, 45 above, and further in view of Pilosof et al. (WO 02/47915).

Shimoda, as modified by Sato and Shreeve, discloses all the basic limitations of the claimed invention except for the housing being formed from a base section and a cover section, the uniformizer elements comprising a reflective surface, a first set of

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grooves in the base section with a corresponding second set of grooves in the cover section.

Pilossof et al., an acknowledged prior art, discloses an imaging head comprising a laser diode array (21) and corresponding micro light-pipe array (12) provided in a housing including a base section and a cover section, with parallel grooves provided on each internal surface of the base section and the cover section, wherein the micro light-pipe array can be configured either as hollow light-pipes with the internal walls coated with a highly reflective coating or as comprising optical fibers.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the uniformizer of Shimoda device as hollow light-pipes with the internal walls coated with a highly reflective coating or as comprising optical fibers seated on parallel grooves provided on the internal face of the respective base and cover sections as taught by Pilossof et al. The motivation for doing so would have been to provide a rigid light transmission with an output illumination relatively uniform.

7. Claims 1, 14, 16-22, 24-25, 28-29, 31-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harrigan et al. (U.S. 5,212,500) in view of Shimoda and Shreeve.

Harrigan et al. discloses a multi-channel print head comprising a plurality of light emitting elements (laser diodes) contained in a housing (50) at one end, wherein the housing includes a base section and a cover section and is provided with parallel

grooves for receiving the linear array of optical fibers (60), and a lens assembly at the opposite end of the housing. With regard to claim 16, Harrigan et al. further teaches a media transport (drum 12), and a print head transport (translator member 16) for scanning the print head across the surface of the photosensitive drum.

Harrigan et al. fails to teach the lens assembly comprising a lens array arranged in a single correspondence with the laser diodes and the optical fibers.

Shimoda discloses a multichannel print head including a linear array of light emitting elements (120) arranged in single correspondence with a linear array of optical fibers (20) and a linear array of lenses (26) (Figs. 6-7).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the print head assembly of Harrigan et al. with a set of linear array of lenses as taught by Shimoda. The motivation for doing so would have been to prevent any crosstalk of the exposure light beams.

Harrigan et al. also fails to teach the lens array being a plurality of compound lenses, each said compound lens comprising a plurality of aspheric surfaces.

Shreeve discloses a projection lens array used in an optical scanner comprising a plurality of compound lenses (three array sets 10-12 of projection lenses 13) (Fig. 1), the lenses being aspherical converging lenses (see Abstract).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate compound lenses having aspherical surfaces in the device of Harrigan et al. as taught by Shreeve. The motivation for doing so would have been minimize the lens aberration to avoid light coupling loss.



Harrigan et al. further teaches the print head transport member (16) including a lead screw (26), and the write laser diodes emitting light with the same wavelength and a secondary laser diode emitting light at a different wavelength and being used for focus adjustment.

On the other hand, although the lenses are known to have sag and specific refractive index, Harrigan et al. does not explicitly teach that the sag of any of the plurality of aspheric surfaces is less than about 40 microns and the refractive index greater than 2.0. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide Harrigan et al. with the lenses having the proper value of sag and refractive index as claimed, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

8. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harrigan et al. in view of Shimoda and Shreeve, as applied to claim 16 above, and further in view of Pilosof et al.

Harrigan et al. in view of Shimoda and Shreeve discloses all the basic limitations of the claimed invention except for the uniformizer elements comprising a reflective surface.

Pilosof et al., an acknowledged prior art, discloses an imaging head comprising a laser diode array (21) and corresponding micro light-pipe array (12) provided in a housing including a base section and a cover section, with parallel grooves provided on

each internal surface of the base section and the cover section, wherein the micro light-pipe array can be configured either as hollow light-pipes with the internal walls coated with a highly reflective coating or as comprising optical fibers.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the uniformizer of Harrigan et al. device as hollow light-pipes with the internal walls coated with a highly reflective coating or as comprising optical fibers seated on parallel grooves provided on the internal face of the respective base and cover sections as taught by Pilosof et al. The motivation for doing so would have been to provide a rigid light transmission with an output illumination relatively uniform.

### ***Response to Arguments***

9. Applicant's arguments with respect to claims 1-6, 9-25 and 28-50 have been considered but are moot in view of the new grounds of rejection.

### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C. Pham whose telephone number is (571) 272-2260. The examiner can normally be reached on M-F 8:30AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on (571) 272-1934. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



HAI PHAM  
PRIMARY EXAMINER

January 4, 2006